the amounts were near normal in the Lakes Region and to the southward also in portions of the west Gulf States and locally in Kansas, Colorado, and Arizona. In other districts as a rule the precipitation was light, particularly in eastern Virginia, the greater part of Florida, and generally in the States between the Mississippi River and the Rocky Mountains.

The snowfall for the month as a whole was generally not large, and there was a gradual decrease in the depth of the snow cover in most sections. However, from time to time there was considerable snow in some of the higher portions of the far western mountains, particularly in California, but the stored snow supply at the end of the month was almost everywhere less than the average at that date, and in the southern districts especially the prospects for late melting were unfavorable.

Except for the rather deep snow covering in some portions of the eastern coal-mining districts during the early part of the month which somewhat hampered operations, the weather conditions were generally not unfavorable for mining and transportation.

RELATIVE HUMIDITY.

The relative humidity for the month as a whole was below the normal in the central Plains States and in the Rocky Mountain region and to the westward. Elsewhere there was relatively more moisture in the atmosphere than usually prevails in February, due largely to the prevalence of moist winds blowing inland from the Gulf of Mexico and Atlantic Ocean.

GENERAL SUMMARY.

The moderate weather, especially during the latter part of the month, was favorable for farm work and the development of vegetation. Plowing for cotton and corn progressed satisfactorily and some planting was done in the extreme south. The weather of the month was favorable for winter grains, except that it was too dry over parts of the Great Plains and there was some freezing and thawing from Ohio eastward to the middle Atlantic coast. In Nebraska the condition of winter wheat improved during February, and in Kansas the drought was relieved in the north and east during the last few days of the month. There was little progress in the advancement of the crop in Oklahoma, and likewise it made slow growth and the stand was poor in Texas. In the central Mississippi and lower Ohio Valley States, the wheat plants were small, but they seemed to be well rooted and presented a satisfactory appearance. Winter wheat was in an unusually excellent condition in the north Pacific Coast States, and generally the mild weather was favorable to winter grains, except where there was a decided lack of moisture in the soil. There was considerable damage to oats during the winter in the Southeastern States.

The planting of crops progressed favorably in the extreme South and early truck made good growth in Florida. Ranges were in good condition in some southern portions of the Rocky Mountain system and over the Pacific States and the month was generally favorable for stock. Early fruits progressed favorably in the South, although some damage was done to citrus fruit in the lower Mississippi Valley by cold weather, and peach buds appeared to be badly winterkilled in the Central States, and more or less damaged in the Lakes Region.

Average accumulated departures for February, 1918.

Districts.	Temperature.			Precipitation.			Cloudiness.		Relative humidity.	
	General mean for the current month.	Departure for the current month.	Accumulated departure since Jan. 1.	General mean for the current month.	Departure for the current month.	Accumulated departure since Jan. 1.	General mean for the current month.	Departure from the normal.	General mean for the current month.	Departure from the normal.
	°F.	°F.	°F.	Ins.	Ins.	Ins.	0–10.		P. ct.	
New England	22.4	−3.4	−10.8	2.47	−0.90	−1.70	6.1	+0.7	77	+3
Middle Atlantic	33.3	+0.5	−8.4	1.32	−2.00	−1.30	5.5	0.0	71	−2
South Atlantic	52.4	+4.6	−2.0	1.41	−2.70	−3.70	5.0	−0.2	76	+1
Florida Peninsula	70.6	+3.8	+1.1	0.90	−1.60	−2.70	4.0	−0.2	81	+1
East Gulf	56.3	+5.4	−0.7	2.15	−3.60	−1.30	6.0	+0.5	76	+1
West Gulf	52.6	+3.0	−4.4	0.98	−1.80	−3.00	5.8	+0.9	74	0
Ohio Valley and Tennessee	38.0	+2.4	−9.7	2.25	−1.30	−0.60	6.1	−0.1	75	0
Lower Lakes	24.5	−0.2	−10.6	2.25	−0.20	0.00	6.6	−0.2	80	0
Upper Lakes	17.0	−2.2	−12.0	2.06	+0.30	+0.90	6.1	−0.2	83	+2
North Dakota	11.5	+4.6	−0.6	0.20	−0.30	−0.30	4.9	−0.1	83	+2
Upper Mississippi Valley	26.7	+2.2	−8.6	1.19	−0.60	−0.90	5.3	0.0	78	−1
Missouri Valley	28.2	+3.8	−4.7	0.94	0.00	0.00	4.4	−0.8	75	−1
Northern slope	23.1	+1.6	−1.3	0.73	−0.10	+0.20	5.4	+0.2	70	−3
Middle slope	37.2	+5.0	−2.8	0.79	0.00	+0.10	3.7	−0.8	57	−10
Southern slope	49.5	+5.0	+0.2	0.11	−0.80	−0.80	3.6	−0.9	45	−17
Southern Plateau	45.8	+1.0	+0.3	0.50	−0.20	−0.10	3.1	−0.5	45	−3
Middle Plateau	32.4	−0.5	+1.0	0.94	−0.20	−0.20	5.1	−0.1	61	−6
Northern Plateau	33.6	+1.5	+5.8	0.92	−0.50	+0.10	6.9	+0.5	69	−6
North Pacific	41.4	+0.1	+4.8	6.88	+1.60	+0.80	7.2	0.0	78	−4
Middle Pacific	48.3	−0.7	+1.2	4.39	+0.10	−3.50	5.1	−0.5	74	−3
South Pacific	53.6	+1.0	+2.7	5.47	+3.00	+1.00	5.0	+0.6	69	−2

WEATHER CONDITIONS OVER THE NORTH ATLANTIC OCEAN DURING FEBRUARY, 1917.

The data presented are for February, 1917, and comparison and study of same should be in connection with those appearing in the REVIEW for that month.

Chart IX (XLVI–18) shows for February, 1917, the principal storm track and averages of pressure, air temperature, water surface temperature, and prevailing direction of the wind at 7 a. m., 75th meridian time (Greenwich mean noon). Notes on the locations and courses of the more severe storms of the month are included in the following general summary.

PRESSURE.

The distribution of the mean atmospheric pressure for the month did not differ materially from the normal. The Azores, or North Atlantic HIGH, was nearly normal in position and extent, and slightly below in intensity. Separated by a shallow trough there was a second long and narrow area of high pressure that extended from the 48th parallel to eastern Texas. St. Johns, N. F., was near the southern limits of a well-developed LOW, with a minimum average pressure of 29.65 inches, where the normal is about 29.82 inches. The gradients over the western and middle divisions of the ocean were practically normal, while east of the 30th meridian they were comparatively weak. The pressure changes from day to day were not unusual for February when the fluctuations are often rapid, especially in northern waters.

The following table gives for a number of selected 5-degree squares the average pressure for each of the three decades, as well as the highest and lowest individual readings reported during the month within the respective squares.

Pressure over North Atlantic during February, 1917, by 5-degree squares.

Position of 5-degree squares.		Decade means.			Extremes.			
					Highest.		Lowest.	
Latitude.	Longitude.	I.	II.	III.*	Pressure.	Date.	Pressure.	Date.
°	°	*In.*	*In.*	*In.*	*In.*		*In.*	
60-65 N.	20-25 W.	29.86	29.86	29.90	30.10	Feb. 7,8,10	29.48	Feb. 3.
55-60 N.	35-40 W.	29.77	29.69	29.86	30.35	Feb. 10	29.18	Feb. 2,17.
55-60 N.	0- 5 W.	30.07	30.10	30.09	30.48	Feb. 8	29.62	Feb. 3.
50-55 N.	55-60 W.	29.50	29.78	29.89	30.10	Feb. 23	29.02	Feb. 3.
50-55 N.	25-30 W.	29.92	29.69	29.99	30.40	Feb. 7	29.50	Feb. 2.
50-55 N.	5-10 W.	30.13	30.00	30.25	30.52	Feb. 8	29.66	Feb. 1.
45-50 N.	65-70 W.	29.51	29.96	30.05	30.30	Feb. 19	29.30	Feb. 4.
45-50 N.	50-55 W.	29.44	29.75	29.80	30.36	Feb. 26	28.80	Feb. 1,3.
45-50 N.	0- 5 W.	30.00	29.98	30.29	30.40	Feb. 26,27	29.68	Feb. 1.
40-45 N.	70-75 W.	29.64	30.06	30.10	30.42	Feb. 12,13	29.04	Feb. 5.
40-45 N.	5-10 W.	29.85	29.93	30.31	30.40	Feb. 26	29.59	Feb. 13.
35-40 N.	75-80 W.	29.93	30.14	30.13	30.60	Feb. 13	29.40	Feb. 9.
35-40 N.	35-40 W.	30.14	29.98	30.10	30.41	Feb. 6	29.70	Feb. 18.
35-40 N.	10-15 W.	29.90	29.98	30.24	30.32	Feb. 20,22	29.55	Feb. 4.
30-35 N.	25-30 W.	30.16	30.14	30.21	30.40	Feb. 6	29.82	Feb. 13.
30-35 N.	5-10 W.	29.88	30.06	30.18	30.34	Feb. 19	29.50	Feb. 4.
25-30 N.	95-100 W.	30.29	30.06	30.00	30.32	Feb. 2	29.83	Feb. 17.
25-30 N.	15-20 W.	30.07	30.15	30.17	30.33	Feb. 19	29.74	Feb. 12.
20-25 N.	35-90 W.	30.17	30.08	30.08	30.43	Feb. 3	29.98	Feb. 17.
15-20 N.	20-25 W.	30.06	30.07	30.06	30.20	Feb. 16,17	29.92	Feb. 12.

* Mean of last 8 days of the month.

The means presented in the above table are based on the daily pressure values, determined by interpolation, of each square on the MS. daily synoptic chart of the North Atlantic Ocean compiled by the Marine Section of the Weather Bureau.

GALES.

The number of days on which gales occurred during February, 1917, was considerably less than usual over the entire ocean, with the exception of the limited area between the 25th and 40th parallels and the 70th and 75th meridians, where they were slightly above the normal.

On February 1 a LOW was central about 150 miles east of St. Johns, N. F., where the barometer reading was 28.80 inches. Westerly and southwesterly gales of from 40 to 70 miles an hour, accompanied by hail and snow, prevailed over the region between the 35th and 45th parallels and the 35th and 55th meridians. This area of low pressure remained nearly stationery until February 4, but the storm area varied considerably from day to day, reaching its maximum extent on the 3d, when there was a HIGH with a crest of 30.64 inches near Pensacola, Fla. The steep gradient between these two areas was responsible for the strong northwest gales that swept the American coast from the Gulf of Mexico to Nova Scotia; heavy winds were also reported as far east as the 45th meridian, north of the 38th parallel. On the 5th a LOW of 29.04 inches was central near Boston, while the HIGH with a crest of 30.58 inches was in the vicinity of Corpus Christi, Tex. Gales of increased force raged along the coast, velocities of over 50 miles an hour being reported by a number of vessels, although the storm area was not so extensive as on the 4th. On the 5th there was a second LOW near latitude 50°, longitude 25°, causing moderate to strong gales over the eastern division of the steamer lanes.

On the 6th the American LOW surrounded the greater part of Newfoundland, the isotherm of 29.1 inches extending well into the Gulf of St. Lawrence. Winds of gale force were still reported by a few vessels between the 30th and 45th parallels, although they had moderated considerably over the storm area of the day before. The European LOW of the 5th was now central near Balboa, Spain, and moderate northwest gales were encountered by a few vessels between the 20th meridian and the French coast. From the 7th to the 9th, inclusive, a LOW of moderate intensity was central near the Straits of Gibralter, and on the former date northerly gales prevailed between the Madeiras and the Azores. On the 9th a well-developed disturbance was in the vicinity of New York, where the barometer read 29.36 inches; light to moderate winds prevailed along the greater part of the American coast, and gales were encountered some distance to the eastward of Georgia, one vessel near latitiude 37°, longitude 61°, recording a southerly wind of 55 miles an hour. This LOW moved in a northeasterly direction, increasing in intensity, and on the 10th covered a large portion of the Gulf of St. Lawrence, the barometer at Chatham reading 28.94 inches. Westerly and southwesterly gales, with snow, swept over the territory between the 35th and 41st parallels and the 60th meridian and the American coast. From the 11th to the 15th the atmospheric conditions were comparatively sluggish, and no heavy winds were reported, although there were a few areas of low pressure of slight intensity over different parts of the ocean during that period. On Chart III (XLV-12) tracks of low areas for February, 1917, a LOW is shown that on the evening of the 12th was near the boundary of Arizona and California. This was too far south and west to appear on Chart IX until the evening of the 13th, when it is shown as LOW *I*, near El Paso, Tex. It moved eastward with a comparatively uniform rate, and on the morning of the 16th the center was about 200 miles east of Boston. The maximum velocity of the wind reported was 40 miles an hour, experienced by three vessels in widely scattered positions in the southerly and easterly gradients. LOW *I* then moved rapidly toward the northeast, and on the morning of the 17th was off the coast of Labrador, conditions of wind and weather having changed but little since the previous day. It curved sharply toward the southeast, and on the 18th the center was near latitude 38°, longitude 35°; moderate winds still prevailed, for the most part, although a few reports were received denoting moderate gales, from vessels as far south as the Azores. It then curved sharply toward the northeast, and on the 19th was apparently central near latitude 53°, longitude 29°, although this was indeterminate on account of lack of observations. The force of the wind had moderated since the previous day, as the maximum velocity reported over the steamer lanes was 36 miles an hour. The LOW recurved toward the east, and on the 20th surrounded the greater part of Ireland; wind conditions apparently remained about the same as on the 19th, although no vessels reports were received from east of the 20th meridian. From the 20th to the 23d no atmospheric depression of any consequence was reported. On the 24th a well-developed LOW of 29.50 inches was central near latitude 40°, longitude 43°; one vessel in the southwest quadrant encountered a northwest gale of 65 miles an hour, although the storm area was limited. For the remainder of the month there were no unusual features, and only a few scattered reports showing winds of gale force were received during that period.

AIR TEMPERATURES.

The average monthly temperature of the air over the ocean, as compared with the normal, varied considerably in different localities. Large positive departures oc-

curred in the waters adjacent to the coasts of Europe and the United States, while over a limited area off the coast of Newfoundland the temperature was considerably below the normal. In the northern part of the Gulf of Mexico, the departures ranged from +1 to +6 degrees, while the southern portion they were slightly negative.

The average temperature for the three decades of the month did not differ as much in northern waters, as in January, and the fluctuations from day to day also seemed to be less than usual. In the 5-degree square that includes the coast of Labrador, where the greatest daily variations usually occur, the temperature ranged from 15° on the 13th to 36° on the 8th, and again on the 19th.

The following table gives the temperature departures for the month at a number of Canadian and United States Weather Bureau Stations on the Atlantic and Gulf coasts.

	°F.		°F.
St. Johns, N. F.	−0.6	Norfolk, Va.	−3.0
Sydney, C. B. I.	−0.6	Hatteras, N. C.	−2.6
Halifax, N. S.	−0.8	Charleston, S. C.	−0.9
Eastport, Me.	−3.8	Key West, Fla.	−1.6
Portland, Me.	−4.5	Tampa, Fla.	+0.8
Boston, Mass.	−2.2	Mobile, Ala.	+1.2
Nantucket, Mass.	−5.0	New Orleans, La.	+2.5
Block Island, R. I.	−3.8	Galveston, Tex.	+1.6
New York, N. Y.	−2.9	Corpus Christi, Tex.	+3.1

WATER SURFACE TEMPERATURE.

The monthly average temperature of the water at the surface was considerably below the normal over the entire ocean with the exception of the region in the vicinity of the Azores and the Madeiras, and within the northeast trade wind limits, where the positive departures ranged from 1 to 3 degrees. The temperature of the Gulf Stream was from 1 to 3 degrees below the normal, while the negative departures in the waters adjacent to the American coast, north of Florida, were even greater. The variations in the temperature, from day to day, in the waters off the Banks of Newfoundland, were not unusually large for that region, the temperature varying from 35° on the 20th to 50° on the 14th.

FOG.

The month was remarkable for the scarcity of fog over all parts of the ocean. The maximum amount occurred in the 5-degree square between latitude 40°–45°, longitude 50°–55°, where it was reported on two days, a percentage of 7, while the normal percentage for that square is from 30 to 35. Fog was observed on one day off Hatteras, and also in the Gulf of Mexico, while none was recorded over the steamer lanes east of the Banks of Newfoundland.

HAIL AND SNOW.

There was little hail reported during the month as it did not occur on more than one day in any 5-degree square.

Snow was recorded on six days in the square between latitude 40°–45°, and longitude 60°–65°, and on from two to four days in the waters adjacent to the American coast, north of the 35th parallel. It was scarce over the steamer routes, none being reported east of the 40th meridian.

Winds of 50 miles per hour (22.4 m./sec.) or over, during February, 1918.

Station.	Date.	Velocity.	Direction.	Station.	Date.	Velocity.	Direction.	Station.	Date.	Velocity.	Direction.	Station.	Date.	Velocity.	Direction.
		Mls./hr.				*Mls./hr.*				*Mls./hr.*				*Mls./hr.*	
Alpena, Mich.	25	54	nw.	Ellendale, N. Dak.	14	57	ne.	Mount Tamalpais-Continued.				Providence, R. I.	4	54	nw.
Do.	26	54	nw.	El Paso, Tex.	11	50	w.	Do.	24	64	nw.	Do.	5	53	nw.
Block Island, R. I.	5	70	nw.	Do.	27	66	sw.	Do.	27	58	n.	Do.	15	59	nw.
Do.	15	58	nw.	Erie, Pa.	8	50	se.	Nantucket, Mass.	19	55	sw.	Do.	20	65	nw.
Do.	21	50	nw.	Do.	12	56	sw.	Do.	20	56	sw.	Do.	26	68	w.
Do.	26	68	w.	Do.	14	50	se.	Do.	26	55	w.	Rochester, N. Y.	26	50	w.
Buffalo, N. Y.	3	52	w.	Do.	15	50	sw.	Nashville, Tenn.	25	60	nw.	Saginaw, Mich.	25	54	nw.
Do.	10	50	w.	Do.	19	50	se.	New York, N. Y.	4	58	nw.	Do.	26	52	nw.
Do.	12	70	sw.	Eureka, Cal.	6	50	sw.	Do.	5	56	nw.	St. Louis, Mo.	14	65	sw.
Do.	14	60	sw.	Evansville, Ind.	12	54	sw.	Do.	12	50	w.	Do.	19	50	nw.
Do.	15	70	sw.	Do.	25	55	w.	Do.	13	50	w.	Do.	25	50	nw.
Do.	19	72	w.	Grand Junct'n, Cal.	13	52	w.	Do.	15	66	nw.	Sandusky, Ohio.	12	50	sw.
Do.	20	64	w.	Green Bay, Wis.	14	57	ne.	Do.	17	60	nw.	Do.	14	52	w.
Do.	24	54	w.	Hannibal, Mo.	14	54	sw.	Do.	20	70	nw.	Do.	25	58	w.
Do.	25	64	s.	Indianapolis, Ind.	14	50	w.	Do.	21	62	nw.	Do.	26	54	nw.
Do.	26	84	w.	Do.	19	54	w.	Do.	26	81	nw.	Sandy Hook, N. J.	5	52	w.
Burlington, Vt.	19	56	s.	Do.	25	71	s.	Norfolk, Va.	26	58	w.	Do.	19	52	s.
Canton, N. Y.	26	62	w.	Iola, Kans.	27	58	ne.	North Head, Wash.	3	58	se.	Do.	20	53	sw.
Chattanooga, Tenn	25	53	nw.	Kansas City, Mo.	25	53	nw.	Do.	4	72	se.	Do.	26	73	w.
Cheyenne, Wyo.	2	59	nw.	Knoxville, Tenn.	25	30	s.	Do.	6	60	se.	Sioux City, Iowa.	25	51	nw.
Do.	3	53	w.	Lander, Wyo.	5	56	w.	Do.	8	52	se.	Syracuse, N. Y.	9	50	s.
Do.	5	76	w.	Lexington, Ky.	12	60	sw.	Do.	9	58	se.	Do.	14	51	s.
Do.	6	53	w.	Do.	14	56	sw.	Do.	11	50	sw.	Do.	19	52	s.
Do.	14	64	w.	Do.	25	56	nw.	Do.	25	50	sw.	Do.	26	56	w.
Do.	25	62	w.	Lincoln, Nebr.	14	54	nw.	Do.	26	56	nw.	Tatoosh Island, Wash.	3	64	s.
Do.	26	71	w.	Little Rock, Ark.	25	51	nw.	Oswego, N. Y.	26	50	w.	Do.	4	68	s.
Cincinnati, Ohio.	12	51	sw.	Louisville, Ky.	12	60	sw.	Pierre, S. Dak.	13	50	ne.	Do.	8	64	s.
Cleveland, Ohio.	15	50	w.	Do.	14	55	s.	Do.	14	52	ne.	Do.	9	60	s.
Do.	19	52	w.	Do.	25	65	w.	Pittsburgh, Pa.	26	56	w.	Do.	15	53	e.
Do.	20	54	w.	Memphis, Tenn.	25	60	nw.	Point Reyes Light, Cal.	6	54	s.	Do.	19	52	e.
Do.	25	56	w.	Minneapolis, Minn.	14	54	ne.	Do.	7	60	nw.	Do.	25	60	s.
Do.	26	66	w.	Modena, Utah.	13	60	sw.	Do.	14	58	nw.	Toledo, Ohio.	15	54	sw.
Columbus, Ohio.	14	52	w.	Mount Tamalpais, Cal.	5	70	sw.	Do.	16	58	s.	Do.	19	50	s.
Do.	15	54	w.	Do.	6	58	s.	Do.	17	71	nw.	Do.	25	62	w.
Do.	19	52	nw.	Do.	7	60	nw.	Do.	18	62	nw.	Do.	26	54	w.
Do.	25	64	nw.	Do.	11	64	nw.	Do.	23	50	s.	Trenton, N. J.	20	56	sw.
Do.	26	58	nw.	Do.	12	76	nw.	Do.	24	61	nw.	Do.	26	70	w.
Corpus Christi, Tex	27	54	se.	Do.	14	54	nw.	Do.	26	62	nw.	Washington, D. C.	26	50	nw.
Dayton, Ohio.	25	60	nw.	Do.	16	50	s.	Port Huron, Mich.	25	57	nw.	Wichita, Kans.	14	59	nw.
Detroit, Mich.	14	54	w.	Do.	17	54	nw.	Do.	26	55	w.	Do.	27	52	ne.
Do.	26	58	nw.	Do.	18	64	nw.								
Duluth, Minn.	25	50	nw.												